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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT

PAPER NUMBER

1774

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11

Please find below and/or attached an Office communication concerning this application or proceeding.

AS41

Office Action Summary

Application No.

09/857,300

Applicant(s)

KATHIRGAMANATHAN,
POOPATHY

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-34 and 36-42 is/are pending in the application.
- 4a) Of the above claim(s) 40 and 42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-34, 36-39 and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 22-34 and 36-42 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

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1. This Office action is in response to applicant's amendment received June 04, 2003 (Paper No. 9), which amends claims 22, 24, 28, 29, 31, 32 and 36, cancels claim 35, and adds claims 37-42.

Claims 22-34 and 36-42 are pending.

2. The invention originally claimed (an electroluminescent device) and newly submitted claim 41 are related as combination and subcombination. New claim 41 will be examined along with the claims directed to the originally claimed invention.

3. Newly submitted claims 40 and 42 are directed to inventions that are independent or distinct from the invention originally claimed for the following reasons:

New claim 40 and the invention originally claimed are related as process of making and product made. New claim 42 and the invention originally claimed are also somewhat related as process of making and product made in that the process of claim 42 makes a component of the originally claimed invention. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product can be made by a materially different process such as reacting lithium hydroxide with 8-hydroxyquinoline to make the lithium quinolate.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 40 and 42 are withdrawn from consideration as being directed to non-elected inventions. See 37 CFR 1.142(b) and MPEP § 821.03.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 22-25, 37 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by VanSlyke et al. (US 4,720,432).

See the whole patent. In particular, see column 4, lines 36-56, c. 5, l. 34-50, c. 7, l. 49-c. 9, l. 36, c. 11, l. 6-c. 12, l. 10 (especially c. 12, l. 3), c. 12, l. 50-68 and c. 14, l. 7-10.

VanSlyke's disclosure of "Lithium oxine (a.k.a., 8-quinolinol lithium)" anticipates a lithium quinolate as claimed in present claim 41.

Although VanSlyke et al. give no specific working example of a device comprising a lithium quinolate layer, one of ordinary skill in the art could at once envisage devices of claims 22-25 and 37 based on VanSlyke's disclosure as a whole and especially based on VanSlyke's disclosure of "Lithium oxine (a.k.a., 8-quinolinol lithium)" as a useful chelated oxinoid compound for use in the organic electron injecting and transporting zone of VanSlyke's

electroluminescent device. In VanSlyke's devices, light emission occurs from the layer of chelated oxinoid compound. Lithium oxine is inherently capable of emitting light within the range of wavelengths associated with blue light.

With respect to the language of present claims 22 and 41 regarding the process by which the lithium quinolate is made, product-by-process claims are not limited to the method steps recited, only to the structure implied by the steps. In the present case, the recited process limitations add no positive structural limitations to the lithium quinolate made by the recited process other than to define optional substituent(s) of the quinolate.

6. Claims 22-24, 29, 30, 36-39 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 6-145146.

JP 6-145146 discloses various metal quinolates for use in an electroluminescent device. The metal of the metal quinolates may be lithium. For example, see paragraphs [0004]-[0005] and [0030].

The metal quinolates can be used in the luminous layer of the device, sandwiched between an anode and a metal cathode. The metal quinolates are also disclosed as having good electron transport properties. The device may further comprise a hole injecting layer between the anode and the luminous layer and/or may further comprise an electron injecting layer between the cathode and the luminous layer. Various known hole transporting materials are disclosed for use in the hole injecting layer and various known electron transporting materials are

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disclosed for use in the electron injecting layer. TPD is specifically disclosed for use in the hole injecting layer. For example, see paragraphs [0007] and [0010]-[0019].

Although JP 6-145146 gives no specific working example of a device comprising a lithium quinolate layer, one of ordinary skill in the art could at once envisage devices meeting the limitations of present claims 22-24, 29, 30 and 36-39 based on the prior art disclosure as a whole and especially based on the prior art disclosure that M in the formulae shown in paragraphs [0004]-[0005] may be lithium. These lithium complexes are inherently capable of emitting light within the range of wavelengths associated with blue light.

With respect to the language of present claims 22, 39 and 41 regarding the process by which the lithium quinolate is made, product-by-process claims are not limited to the method steps recited, only to the structure implied by the steps. In the present case, the recited process limitations add no positive structural limitations to the lithium quinolate made by the recited process other than to define optional substituent(s) of the quinolate in the case of claims 22 and 41.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 29, 30, 32, 34, 36, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over VanSlyke et al. (US 4,720,432) as applied to claims 22-25, 37 and 41 above, and for the further reasons set forth below.

VanSlyke et al. teach that there must be at least one layer forming the electron injecting and transporting zone and teach that metal chelated oxinoid compounds such as chelates of oxine may be used to form the electron injecting and transporting layers of the device (emphasis added).

With respect to present claims 29, 30, 36, 38 and 39, based on VanSlyke's teachings, one of ordinary skill in the art at the time of the invention would have readily recognized that there may be two or more layers forming the electron injecting and transporting zone of VanSlyke's device. It would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to include a layer of an electron injecting material between a cathode and a layer of lithium oxine in a device according to VanSlyke in order to make a device having a multi-layered electron injecting and transporting zone as suggested by VanSlyke.

With respect to present claims 32 and 34, VanSlyke et al. do not explicitly disclose using a mixture of materials in a single layer of the electron injecting and transporting zone, but it would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to utilize two materials in combination that are taught to be useful for the same purpose. Since VanSlyke et al. disclose various metal chelated oxinoid compounds as being useful for forming the electron injecting and transporting layers of the device, one of ordinary skill in the art at the time of the invention would have reasonably expected that mixtures of

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different metal chelated oxinoid compounds could be used for forming a layer of the electron injecting and transporting zone.

9. Claims 22-34 and 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori et al. (US 5,281,489) in view of VanSlyke et al. (US 4,720,432) or JP 6-145146.

See the whole Mori patent. In particular, see column 3, lines 22-47, c. 4, l. 20-c. 8, l. 30, c. 23, l. 37-c. 25, l. 23, c. 26, l. 63-c. 27, l. 38 and c. 28, l. 47-c. 29, l. 49.

Mori et al. disclose an electroluminescent (EL) device comprising an organic luminescent layer disposed between an anode and a cathode. The device may further comprise a hole injecting/transporting layer disposed between the anode and the luminescent layer and/or may further comprise a hole inhibiting layer (made of an electron moving/donating agent) disposed between the cathode and the luminescent layer. The luminescent layer comprises a mixture of at least one fluorescent luminescent agent, at least one hole moving/donating agent, and at least one electron moving/donating agent.

Mori et al. disclose that metal complexes of 8-hydroxyquinolines may be used as the electron moving/donating agent (c. 8, l. 29-30 and c. 29, l. 25) and that metal complexes may be used as the fluorescent luminescent agent (c. 24, l. 65-68).

Mori et al. disclose TPD and poly(vinylcarbazole) for use as the hole moving/ donating agent (c. 4, l. 44-46 and c. 6, l. 56-57).

Mori et al. disclose polyolefins such as polystyrene for use as a binder (c. 27, l. 22 and c. 29, l. 38-39).

While Mori et al. disclose that metal complexes of 8-hydroxyquinolines may be used as the electron moving/donating agent and may be used as the fluorescent luminescent agent, Mori et al. do not specifically disclose the use of lithium complexes of 8-hydroxyquinolines.

Lithium complexes of 8-hydroxyquinolines were known in the art at the time of the invention as being suitable for use as a luminescent material in an EL device and as being suitable for use as an electron transporting/injecting material in an EL device.

VanSlyke et al. disclose lithium oxine for use in the organic electron injecting and transporting zone of an EL device. See the whole VanSlyke patent. In particular, see column 4, lines 36-56, c. 5, l. 34-50, c. 7, l. 49-c. 9, l. 36, c. 11, l. 6-c. 12, l. 10 (especially c. 12, l. 3), c. 12, l. 50-68 and c. 14, l. 7-10.

JP 6-145146 discloses various metal quinolates for use in an EL device. The metal of the metal quinolates may be lithium. For example, see paragraphs [0004]-[0005] and [0030]. The metal quinolates can be used in the luminous layer of the device, sandwiched between an anode and a metal cathode. The metal quinolates are also disclosed as having good electron transport properties.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention, having knowledge of the disclosure of VanSlyke et al. or JP 6-145146, to utilize a lithium complex of 8-hydroxyquinoline as an electron moving/donating agent or as a fluorescent luminescent agent in a device according to Mori et al. because the teachings of VanSlyke et al. or JP 6-145146 demonstrate that lithium complexes of 8-hydroxyquinolines are known materials, and were known in the art at the time of the invention to be suitable for Mori's purposes.

Guided by the teachings of Mori et al., it would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum combinations of materials for the different layers of an EL device comprising a lithium complex of 8-hydroxyquinoline as an electron moving/donating agent or as a fluorescent luminescent agent.

The lithium complexes disclosed by VanSlyke et al. and JP 6-145146 are inherently capable of emitting light within the range of wavelengths associated with blue light.

With respect to the language of present claims 22 and 39 regarding the process by which the lithium quinolate is made, product-by-process claims are not limited to the method steps recited, only to the structure implied by the steps. In the present case, the recited process limitations add no positive structural limitations to the lithium quinolate made by the recited process other than to define optional substituent(s) of the quinolate in the case of claim 22.

10. Applicant's arguments filed June 04, 2003 have been fully considered but they are not persuasive.

Applicant argues that none of the applied prior art references teach or suggest obtaining a blue emissive lithium quinolate from a reaction in a solvent comprising acetonitrile as in the presently claimed invention. Applicant refers to an article by Schmitz et al. (*Chem. Mater.*, Vol. 12, No. 10, 2000, pp. 3012-3019, attached to applicant's response as Exhibit A) as demonstrating that a method other than the method recited in the present product claims results in lithium quinolate that fluoresces blue-green. Applicant argues that the article evidences that, at the time

of the present invention, one skilled in the art did not know how to obtain blue emissive lithium quinolate by the method steps recited in the present claims.

With respect to present claims 36 and 38, applicant's arguments are not persuasive because these claims do not require the lithium quinolate to be blue emissive and do not limit the method by which the lithium quinolate is made.

With respect to present claims 22-34, 37, 39 and 41, applicant's arguments are not persuasive because the claim language regarding blue emission and the language regarding the method by which the lithium quinolate is made do not patentably distinguish the lithium quinolate of these claims from the lithium quinolate disclosed by VanSlyke et al. or JP 6-145146.

The language regarding blue emission does not limit the peak wavelength emitted by the lithium quinolate and does not limit the range of wavelengths emitted by the lithium quinolate. The language regarding blue emission also does not limit the conditions under which the lithium quinolate must be blue-emissive. As demonstrated by the PL and EL curves in Fig. 6 of the present application, lithium quinolate emits light over a range of wavelengths, with the range being different for the PL emission than for the EL emission. The lithium quinolate emits light within the range of wavelengths associated with blue light under PL emission conditions as well as under EL emission conditions, but the peak emission wavelength is within the range of blue light only under PL emission conditions. The peak emission wavelength for EL emission as shown in present Fig. 6 is within the range associated with green light.

As demonstrated by the article by Schmitz et al., lithium quinolates made by a method other than a method comprising the steps set forth in present claims 22, 39 and 41 are capable of

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emitting light within the range of wavelengths associated with blue light. In Table 1 of the Schmitz article, the peak wavelength for PL emission of unsubstituted lithium quinolate (Liq) and of lithium quinolate substituted with an alkyl group (LiMeq) is within the range of blue light.

11. Miscellaneous:

In the penultimate line of claim 22, "heteroyclic" should read --heterocyclic--.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

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The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final
faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be
sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY

August 04, 2003



MARIE YAMNITZKY
PRIMARY EXAMINER

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